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ABSTRACT

As part of a study of the research capacity of agricultural education, this study was conducted to identify factors that characterize research in the field and researchers in agricultural education. Faculty from 12 land grant institutions represented on the NCA-24 Committee on Research in Agricultural Education provided data for the study. Respondent numbers ranged from 1 faculty member at each of 2 institutions to 21 faculty members at 1 institution. Findings show that Agricultural Education faculty averaged less than 15% of their faculty appointment devoted to research, with more than 50% devoted to teaching responsibilities. Respondents also reported wide variations in grant funding, graduate degrees awarded, and research publications. In addition, individual responses ranged from "none" to "expert" for each of the 12 research skill areas and the 27 disciplinary skill areas. Means for each of the items clustered around the midpoint of the five-point response scale, so that the study was not able to discern a core set of research skills or disciplinary skills that characterizes Agricultural Education faculty research capacity. Some recommendations are made for additional study about the research capacity of the field of agricultural education. (Contains 8 figures and 13 references.) (SLD)

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Assessing Research Capacity in Agricultural Education: A Case Study of NCA-24 Institutions

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Abstract

This study was conducted to assess the research capacity of Agricultural Education. Research capacity was defined as the collective capability of university faculty to conduct independent research or to contribute to interdisciplinary research. Agricultural Education research has a relatively short history which has been criticized as being too internally focused. Increased emphasis on interdisciplinary research has prompted the need to identify research and disciplinary strengths in order to determine the potential for Agricultural Education to contribute to interdisciplinary initiatives. The primary purpose of the study was to identify factors that characterize research and researchers in Agricultural Education.

Agricultural Education faculty from twelve Land Grant institutions represented on the NCA-24 Committee on Research in Agricultural Education provided data for this study. Respondents were asked to report information regarding their individual faculty appointment and their level of expertise in several research skill and disciplinary skill areas. Respondent numbers ranged from one faculty member at each of two institutions, to 21 faculty members at one institution.

The findings reported in this study revealed that Agricultural Education faculty averaged less than 15 percent of their faculty appointment devoted to research; while over 50 percent was devoted to teaching responsibilities. The respondents also reported wide variations in grant funding, graduate degrees awarded, and research publications. In addition, individual responses ranged from 'none' to 'expert' for each of the 12 research skill areas and the 27 disciplinary skill areas. Means for each of the items clustered around the midpoint of the five point response scale. Therefore, this study was unable to discern a core set of research skills or disciplinary skills that characterized Agricultural Education faculty research capacity.

Since the faculty respondents comprised a case study of NCA-24 institutions, the results of this study cannot be generalized beyond the participants. However, this study may have implications beyond those who provided data for this study. Recognizing the limits of generalizing results, the following recommendations were proffered. First and foremost, a comprehensive assessment of research capacity should be conducted to allow generalization to the Agricultural Education profession. Furthermore, increased emphasis should be placed on research activities through faculty appointments and graduate student preparation. Finally, Agricultural Education faculty should individually and collectively strive to develop and promote core research and disciplinary skills in order to identify opportunities to make unique contributions to interdisciplinary research initiatives.

Introduction

Land grant universities in the United States have a storied history beginning with the Morrill Act of 1862. This act ceded land to individual states for the purpose of developing postsecondary educational institutions that focused on teaching agriculture and mechanical arts. These new institutions were created to extend educational opportunities for the 'common man' who had not been well-served by the elite Ivy League colleges and universities during the early decades of the 1800s.

Twenty-five years after the Morrill Act, the Hatch Act (1887) was passed by Congress which established Agricultural Experiment Stations in conjunction with land grant universities. Agricultural Experiment Stations were created as a means of facilitating and validating land grant university faculty interests in research. Although teaching had historically been viewed as the singular focus for faculty employed in land grant universities, many early land grant university faculty began to "experiment" with new ideas in their disciplines as the emphasis on increasing agricultural knowledge in order to increase food and fiber production began to swell.

Finally, in 1914, the Smith-Lever Act provided funding to encourage states to develop cooperative extension programs in order to 'extend' the resources of the land grant university beyond the college campus and assist farmers and homemakers in solving their common problems. Extension programs were envisioned as a major initiative to improve the quality of life for disadvantaged citizens by extending the resources and benefits of the land grant university to rural areas.

Each of these acts provided the impetus for the present day, tripartite mission of a land grant university including teaching, research, and extension. These three functions provide a strong system of interrelationships which serve to enhance the efficiency and effectiveness of the land grant system in the U.S.

In 1917, the Smith-Hughes Act provided funding to support the development of Agricultural Education programs in secondary schools. The Smith-Hughes Act specified that funds appropriated in support of the act could be devoted to teacher salaries, supervision, and teacher preparation programs. Thereafter, university level Agricultural Education faculty were employed by land grant colleges and universities to prepare students for careers as secondary agricultural educators.

Over the years, Agricultural Education faculty in land grant universities have devoted their primary effort toward the teaching function. However, in recent years, increasing numbers of faculty have begun to turn their attention toward research. The transition from a discipline devoted primarily to teaching, into a discipline with a significant research emphasis is the primary focus of this paper.

Research in Agricultural Education has a relatively short history. Although Agricultural Education faculty have been employed by land grant universities since the early 1900s, it wasn't until 1974 that the first National Agricultural Education Research Conference was held. Faculty attending this meeting witnessed presentations of research papers on topics primarily related to problems facing secondary agricultural educators. Since that first national research conference, the number and scope of the research papers has increased; however, the primary focus continues to rest with problems facing agricultural educators.

Land grant research administrators (i.e. Experiment Station Directors) have been critical of what may be described as 'naval gazing' research conducted by Agricultural Educators. Research administrators (Jordan, 1993) have suggested that Agricultural Education research should extend beyond its disciplinary confines to identify larger and more significant research problems to address. Agricultural Education research has the potential to contribute to improved teaching and learning in the agricultural and food sciences. Furthermore, numerous authors have suggested that major societal problems require solutions that can only be resolved through interdisciplinary efforts. An ad hoc committee of the National Research Council's Board on Agriculture (April, 2000, p. 5) promoted the need for ". . . multidisciplinary research because the problems in the food, fiber, and natural-resources system demand multidisciplinary approaches and collaboration."

These views suggest that the unique strengths and capabilities of several disciplines are needed to achieve solutions to the complex issues of importance in today's society. Each discipline must therefore identify its unique contributions and potential to 'add value' to interdisciplinary research. Therefore, for the purpose of this study, research capacity was defined as the collective capability of Agricultural Education faculty to conduct independent research or to contribute to interdisciplinary research. Research capacity not only relates to the potential for performing research within the discipline, but also the potential to contribute to developing solutions to larger research problems that lie beyond disciplinary boundaries.

Faculty in Agricultural Education are in a position to contribute to interdisciplinary research in an attempt to develop solutions to major societal problems affecting agriculture and rural areas. However, Agricultural Education as a profession needs to be able to effectively assess and communicate the role and scope of its potential contributions. Agricultural researchers, experiment station directors, and funding agency administrators should be made aware of the potential contributions which agricultural educators can offer to interdisciplinary research. In order to communicate the skills and abilities of Agricultural Education researchers, it is necessary to assess their individual, institutional, and disciplinary strengths.

> "While most public issues and concerns involve people, the scientists who understand people have not been very effective in marketing the value of their skills to those who appropriate public research dollars, to colleagues in other scientific disciplines, and to numerous interest groups. The literature and individual experiences provide many examples. The challenge for social scientists is to enhance the perceived value of their skills and abilities." (Holder, 1998, p. 1).

Agricultural Educators must assume a more progressive and proactive role in promoting their capacity to function effectively as members of interdisciplinary research teams in the agricultural, food, and environmental sciences. Although there is a continuing need for focused research on technical and disciplinary problems, most of the complex social problems facing U.S. citizens will require input from multiple sources to generate appropriate solutions.

MacKenzie (1997) outlined several reasons supporting the need for assessing research capacity. He acknowledged that during periods of enormous change, there was a need for ". . . greater institutional accountability for public funding, dramatic changes in institutional responsibilities, and an on-going individual institutional efforts to document the social, economic, and environmental benefits of programs" (MacKenzie, 1997, p. 1).

Developing an understanding of research capacity is an important prerequisite to promoting interdisciplinary research involving agricultural educators. Research capacity is a broad concept that has dimensions that extend from individual faculty, to Agricultural Education programs within institutions of higher education, and ultimately to the discipline level which encompasses the entire profession (MacKenzie, 1997). Before agricultural educators are in a position to promote their potential contributions to interdisciplinary research, they must first assess what it is they have to offer. Research capacity collectively includes faculty FTEs, faculty appointments, skills, graduate student numbers, and the availability of research support services. Each of these factors are important links in the research chain which is only as strong as its weakest link.

Purposes and Objectives

The purpose of this study was to collect, summarize, and review information regarding Agricultural Education research capacity. The intent was not to conduct a comprehensive review of the research skills of Agricultural Education faculty; rather the intent was to develop baseline data to serve as a 'point of departure' for subsequent efforts to enhance and promote the involvement of Agricultural Education faculty in research.

Specifically, this project was guided by the following objectives:

1. To review indicators of research productivity in Agricultural Education.
2. To assess the human resources available in Agricultural Education to conduct research.
3. To identify research and disciplinary strengths of Agricultural Education faculty.

Methods / Procedures

The data for this project were collected in a two-stage process. Initially, members attending the NCA-24 committee on Agricultural Education Research in February, 2000 were asked to review the data collection instrument. After extensive discussion, the NCA-24 committee members agreed to complete the instrument, based on their individual perspectives and local programs. After completing the instruments, the NCA-24 committee members recommended that instruments be distributed to their respective faculty in order to collect baseline information for each department and to summarize the data for a more comprehensive analysis and review. NCA-24 members were sent an email file attachment of the data collection instrument and asked to have each of their faculty members provide the information requested. Thereafter, each NCA-24 committee member collected the completed instruments from faculty at their respective institution and forwarded them to the authors.

The NCA-24 committee was comprised of Agricultural Education faculty (primarily department administrators) from each of the land grant institutions in the North Central Region. The twelve states in the North Central Region included: Illinois, Indiana, Iowa, Kansas,

Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. In addition, representatives from Arkansas, Oklahoma, and Texas were also invited to participate as members of the committee.

The data collection instrument was comprised of two pages. One page requested information on the respondent's faculty appointment regarding: rank, length of appointment, workload assignment, and tenure status. Respondents were also asked to indicate their level of expertise (scale values of 1 = none to 5 = expert) in several research skill areas related to planning, managing, conducting, and reporting research. In addition, respondents were asked to identify the numbers of: graduate students advised, research manuscripts authored, grants funded, and grant funding received during the five-year period from 1995-1999.

The second page of the data collection instrument asked respondents to indicate their level of expertise (scale values of 1 = none to 5 = expert) on Agricultural Education disciplinary skills organized into four categories labeled: Needs Assessment, Curriculum Development & Instructional Design, Information Transfer & Delivery, and Evaluation & Assessment.

The data were entered onto a personal computer and analyzed using SPSS 10.0. The data were summarized using descriptive statistics since the purpose of this project was to describe the overall characteristics of the Agricultural Education faculty and programs.

Results/Findings

Data collection instruments were received from 73 agricultural educators from land grant Agricultural Education programs in eleven states. The number of responses received per state ranged from one response each from North Dakota and Kansas to 21 responses from Texas. Faculty respondents included: 5 Instructors (6.8%), 14 Assistant Professors (19.2%), 20 Associate Professors (27.4%), and 24 Professors (32.9%). Most Agricultural Education faculty reported they were employed on a 12 month basis (n = 50, 68.5%); although 13 respondents (17.8%) indicated they were employed on a 9 month basis, and 9 respondents reported their faculty appointment was something other than a 9 or 12 month appointment.

Regarding grants and grant funding, Agricultural Education faculty reported receiving (for the 1995-1999 period) an average of just over five grants totaling $377,780. However there was wide variability in the number and amount of grants received by faculty. Nine faculty indicated that they had not received any grants during the five year period and one respondent had received 31 grants during that time. The amount of funding also varied widely from zero to $4.6 million during the five year period.

Figure 1 presents a composite pie chart of Agricultural Education faculty respondent appointments in Teaching, Research, Service, and Administration. On average, Agricultural Education faculty devoted slightly over half (52%) of their time and effort to Teaching responsibilities. In addition, they averaged 20% to Administration, 15% to Research, and 13% to Service activities. This allocation of faculty time

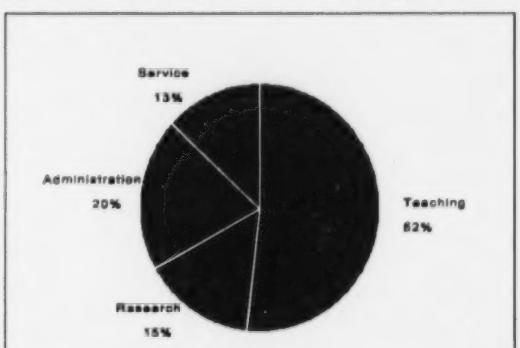

Figure 1. Faculty Appointments

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and effort revealed that Agricultural Education faculty were primarily oriented toward teaching, with lesser but nearly equal time devoted to administrative, research, and service activities.

Figure 2 illustrates the number and proportion of graduate degree recipients advised by Agricultural Education faculty respondents during the 1995-1999 period. Three-fourths of the graduate degrees awarded were at the master's level ($\underline{n}$ = 522) and one fourth ($\underline{n}$ = 172) were at the doctoral level. These data depict a 3:1 ratio of masters:doctoral degrees awarded during the five year period, with an average of approximately 8.08 masters and 2.69 doctoral graduates per faculty respondent.

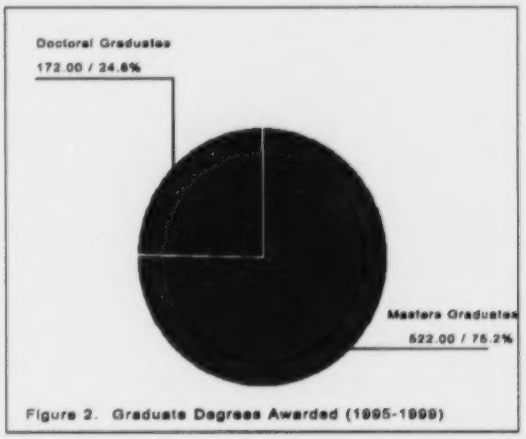

Figure 2. Graduate Degrees Awarded (1995-1999)

Figure 3 presents information from Agricultural Education faculty respondents regarding authorship of research manuscripts during the 1995-1999 period. Approximately two-thirds of the manuscripts authored by the respondents were research papers and one third were journal articles. On average, each faculty member authored over three journal articles (range from 0 to 28, $\underline{M}$ = 3.46) and six research papers (range from 0 to 41, $\underline{M}$ = 6.19) during the five year period.

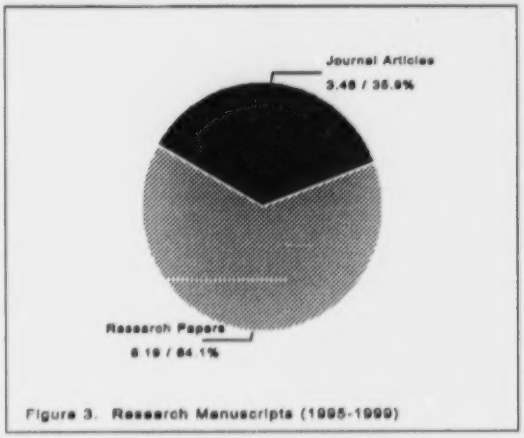

Figure 3. Research Manuscripts (1995-1999)

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Figure 4 presents Agricultural Education faculty responses regarding their self-reported level of expertise in several research skill areas related to planning, managing, conducting, and reporting research. Mean scores for all respondents are illustrated on the bar chart depicted in Figure 4. The highest rated skill area was Project Management which produced a mean rating of 3.37 on the 5.0 point scale. The lowest rated item was Qualitative Research which produced a mean rating of 2.56. Each of the twelve items produced mean ratings that clustered around the 3.0 level indicating 'some experience' with each of the research skills.

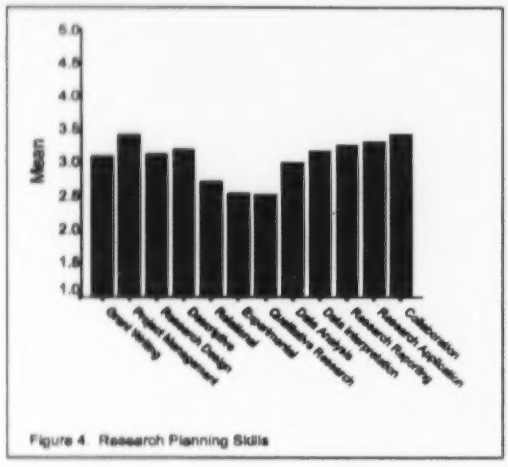

Figure 4. Research Planning Skills

Disciplinary skills in Agricultural Education related to teaching and learning were also self-rated by the respondents. Under the Needs Assessment category, four of the five items produced mean ratings above the 3.0 level (see Figure 5). However, Qualitative Assessment produced a mean rating notably lower (M = 2.75) than the other items in the category. Therefore, respondents revealed that they were less experienced with qualitative assessment that with other disciplinary skills included in the Needs Assessment category.

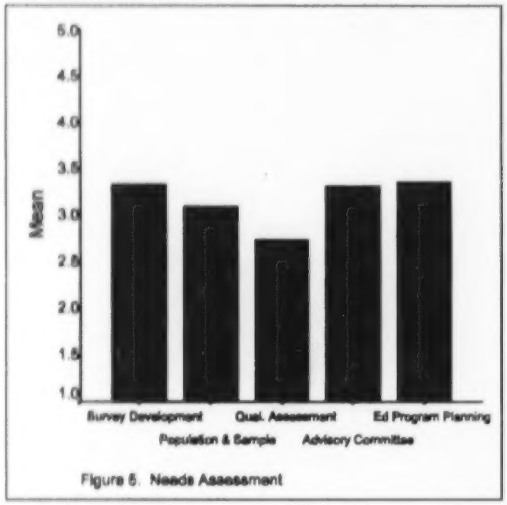

Figure 5. Needs Assessment

Within the category of Curriculum Development & Instructional Design (see Figure 6) respondents were asked to rate their level of expertise regarding six disciplinary skills. The highest rated skill was Developing Objectives (M = 3.68) and the lowest rated skill was Assessing Learning Styles (M = 2.86). Each of the skills in the Curriculum Development & Instructional Design category (with the exception of Assessing Learning Styles) produced mean ratings above the 3.25 level.

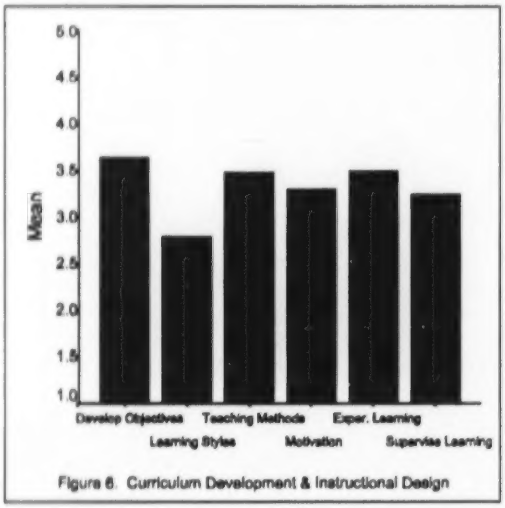

Figure 6. Curriculum Development & Instructional Design

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Figure 7 presents the mean ratings for six skills comprising the Information Transfer & Delivery category. The highest rated skill was Pedagogy (M = 3.54) and the lowest rated skill was Distance Learning (M = 2.75). Again, each of the six skills produced mean ratings which clustered around the 3.00 level indicating 'some expertise' in Information Transfer & Delivery.

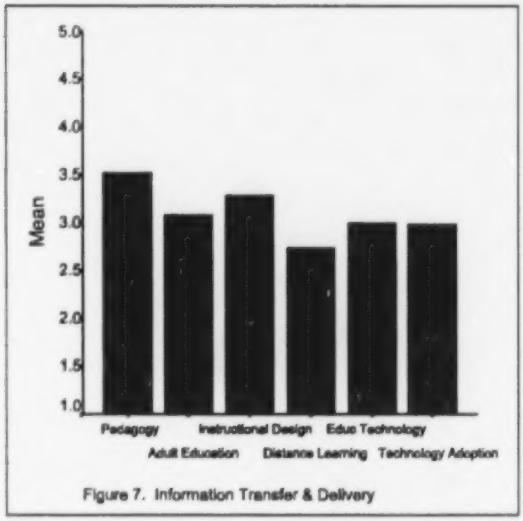

Figure 7. Information Transfer & Delivery

Ten skills were included in the category labeled Evaluation & Assessment which is presented in Figure 8. The highest rated skill in this category was Program Evaluation (M = 3.36) and the lowest rated skill was Performance Reporting (M = 2.69). Therefore, each of the ten skills in this category produced mean ratings that indicated respondents had 'some expertise' in each of the skill areas.

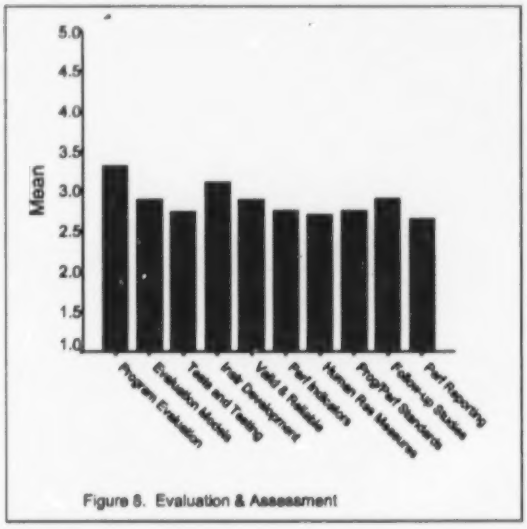

Figure 8. Evaluation & Assessment

It was noted that for the 27 skills included in the four categories, individual responses ranged from 1 (no expertise) to 5 (expert) for each skill. This observation revealed that among Agricultural Education faculty respondents, there were some faculty who had no expertise, while other faculty considered themselves to be experts for each of the disciplinary skill areas assessed.

Conclusions / Recommendations / Implications

Since the Agricultural Education faculty who provided responses for this study were not necessarily representative of the population of all Agricultural Education faculty, the conclusions which follow are limited to the respondents. Therefore, it is not appropriate to generalize these conclusions beyond those individuals who provided responses in this study. However, since this study was intended to provide baseline data, it is suggested that Agricultural Education faculty and administrators throughout the U.S. examine the potential implications of these findings and conclusions for themselves and their programs. Furthermore, leaders in the Agricultural Education profession may wish to examine the insights gained from this study, and move forward on a broader scale to assess the research capacity of all Agricultural Education faculty in order to facilitate generalization to the entire discipline.

Recognizing the limitation of generalizability, the following conclusions were formulated from this effort.

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1. **Agricultural Education faculty place a higher priority on teaching than research.**

From the data collected and summarized in this study, it appears that Agricultural Education faculty have relatively heavy teaching loads in comparison to their appointments in research. Often times, Agricultural Education faculty will also have heavy advisement responsibilities, both at the undergraduate and graduate levels. Each of these factors may weigh against a faculty members= time and ability to conduct research. Furthermore, the expectations of faculty, if they correspond proportionately with their appointment, would lead them to place more emphasis on teaching than on research. Over time, this situation has repeated itself across institutions, even in the face of faculty changes. Agricultural Educators have frequently been recognized and rewarded and for being excellent teachers and advisors, but often command less respect among their institutional colleagues for their research.

In addition to relatively heavy teaching loads, Agricultural Education faculty reported quite heavy assignments in administrative responsibilities. In fact, Agricultural Education faculty reported a larger percent of their appointment devoted to administration than to research. This situation would undoubtedly cause faculty members to divert their attention away from research, and splinter their efforts across multiple functions. Agricultural Education programs in most institutions have relatively small faculty FTEs which probably contributes to the relatively high proportion of the average faculty assignment devoted to administrative responsibilities. Although Agricultural Education faculty may be well suited to perform administrative tasks, the research capacity of the discipline is diminished as a result.

2. **There is wide variability among Agricultural Education faculty regarding authorship of research manuscripts, graduate degree advisement, and grant productivity.**

Common measures of research and scholarly productivity in higher education includes >numbers= of journal articles, research papers, graduate students, and grant dollars received. These easily quantified measures are not necessarily indicative of quality research, but they do allow for comparisons between and among faculty and programs in higher education. On a per faculty basis, the average Agricultural Education faculty member produced approximately one doctoral graduate and one refereed journal article every two years, nearly two masters graduates per year, and slightly more than one funded grant and one research paper per year. When viewed in proportion to faculty assignments, these figures may be reasonable levels of productivity. However, in the context of other faculty and departments in Land Grant Colleges of Agriculture, the numbers may seem low.

For Agricultural Education to elevate its status among peer faculty and programs, it must increase research productivity relative to the standard measures of comparison; i.e. research publications, graduate degrees awarded, and grants funded. Each faculty member should be encouraged to develop a focused research program which is goal oriented and specifies outcomes which are measurable for the purposes of comparison. Faculty hiring decisions should include consideration of each candidate=s record, plan, and potential for making a significant contribution to research efforts, both individually and as a member of multidisciplinary initiatives. Such considerations are important not only for improving the research capacity of Agricultural Education, but also affect the likelihood of the candidate being promoted and tenured at some point in the future.

3. **Agricultural Education faculty do not possess a core of research or disciplinary skills that characterizes expertise in the discipline.**

Although it was apparent that there were individual faculty in Agricultural Education who were considered experts in certain research and/or disciplinary skill areas; this study was unable to distinguish a core set of skills that were uniform across all faculty. This observation prompts several questions which should be addressed relative to further discussion related to enhancing research capacity in Agricultural Education. Is it reasonable to assume that all Agricultural Education faculty should possess a core set of research and/or disciplinary skills? If so, what should those skills encompass? How should those skills be developed in future generations of Agricultural Education faculty? How would those skills manifest themselves so that they can be documented and assessed in faculty hiring decisions? Each of these questions raise important issues which should be addressed by faculty members in Agricultural Education. The American Association for Agricultural Education (AAAE) should be encouraged to direct the Research standing committee to further examine this issue in an effort to enhance research capacity in Agricultural Education.

Based on the findings and conclusions derived from this study it is recommended that Agricultural Education faculty, administrators, and professional association leaders develop a plan to enhance the research capacity of Agricultural Education by:

1. **Conducting a comprehensive assessment of Agricultural Education faculty in the U.S. to determine >research capacity= from a disciplinary perspective.** Whereas this study collected data from a select group of institutions represented on the NCA-24 committee, there is need to summarize similar information from all faculty and institutions throughout the United States. Such a comprehensive study would provide a more solid foundation of empirical evidence upon which future decisions and recommendations should be based.
2. **Increasing faculty appointments and expectations in research.** Although this recommendation has obvious budget implications, there is a need to modify or increase the number of faculty FTEs in Agricultural Education that are devoted to research. Persons and Kajer (1995) noted that Agricultural Education departments throughout the United States had relatively few faculty with Experiment Station appointments. This finding is based on the assumption that land grant faculty who do not have an Experiment Station appointment, have reduced expectations for research productivity. Therefore, one logical strategy for increasing research productivity among Agricultural Education faculty is to add or increase the percentage of their appointment in the Experiment Station.
3. **Identifying opportunities to increase research manuscript authorship and grant funding among Agricultural Education faculty.** Increasing Agricultural Education faculty appointments in the Experiment Station would produce a major cultural shift in most departments and programs. Thereafter, it would logically follow that Agricultural Education faculty would be expected to increase their research productivity measures in the form of refereed journal articles, research papers, graduate degrees awarded, and grant funding
4. **Identifying and promoting core research and disciplinary skills which characterize Agricultural Education research and its potential contribution to interdisciplinary research initiatives.** As a profession, Agricultural Education should engage itself in the

process of defining its Aniche@ in research. Once identified, that message should be clearly communicated to colleagues and administrators. Networking and promoting research and disciplinary strengths of Agricultural Education are important prerequisites to developing collaborative relationships with others through interdisciplinary research initiatives. Colleagues in other departments need to know what and how Agricultural Educators can contribute to solving complex research problems and issues. Such a lack of understanding within the agricultural research community has caused Agricultural Education to frequently be overlooked as a potential collaborator.

5. **Encouraging Agricultural Education doctoral students to engage in interdisciplinary projects to prepare them for future involvement as faculty members.** The changing landscape of agricultural research suggests that faculty success in the future will be dependent on a different set of skills than was required in the past. Therefore, the programs which prepare future generations of faculty members need to change to keep pace with the changing expectations. Doctoral students should be encouraged (possibly even required) to engage in collaborative projects with students from other disciplines in order for all to experience the synergy that occurs when individuals from different perspectives and skill sets work together toward a common goal. These experiences are extremely important to prompt students to break out of their disciplinary mode of operation in order to recognize the strengths and limitations of other disciplines.

Research capacity is a somewhat nebulous concept, especially in the context of Agricultural Education programs. However, as a discipline, Agricultural Education has enormous potential to make significant contributions to complex research problems and issues. In order to realize its full potential, Agricultural Educators need to take a more proactive and assertive role in defining and enhancing research capacity within the profession.

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